How Laser Printer Work

Laser printers is an output device which uses electrostatic digital printing process to produce high quality of graphics and texts. Working of a laser printer can be described as a three-step process. The process of printing a document on a laser printer goes through the following major stages :

- Receiving data from the host PC
- Processing the received data into dots
- Converting dots into permanent image on paper

Different Laser printers implement these steps in various ways, but they are fundamentally the same. For **example**, less expensive printers may rely on the host PC to perform most of the processing tasks, whereas the costlier ones incorporate enough computing hardware to do the processing themselves. A discussion on these printing stages is presented below.
Receiving data from the host PC : When a user makes a request for printing in an application, the application passes on the request to the OS, which establishes communication with the hardware services in the PC that are needed to for communicating with the printer. The Interface controller of the formatter PCA receives input from the PC and as the name indicates, formats it for printing. So, all input ports on the printer, including parallel, serial, USB, network, and infra-red, plug into the formatter. **Processing the received data into dots :** After the printer receives the data from the PC, the controller part of the formatter processes the data. The data processing can be divided into three steps :

1. **Interpreting the received data :** The printer controller CPU begins interpreting or processing the received data with the help of the

firmware stored in the ROM that supports the Page Description Language (PDL) that the printer uses. The interpretation process starts with examination of the incoming data to distinguish the control commands from the actual content of the document.

2. **Formatting the interpreted data :** The formatting process involves the interpretation of the commands that decide how the data will be placed on the page. The formatting process differs depending on the processing capabilities of the printer.
3. **Rasterizing the formatted page :** In the final stage of processing the data, the controller converts the bit-mapped page into a pattern of tiny dots that will be created on the print media. This process is called rasterization. The array of dots is then stored in a page buffer and ready for printing.

Converting dots into permanent image on paper : Inside a Laser printer the image formation process revolves around the Organic Photo Conductive (OPC) drum. The conversion of the raster dots in printer buffer into a complete image on paper consists of the following six steps :

- Cleaning of the OPC Drum.
- Conditioning of the OPC Drum.
- Writing the image onto the OPC Drum using Laser.
- Developing the image on the OPC Drum with Toner.
- Transferring the toner image from OPC drum to the paper, and
- Fusing the image permanently on the paper.